

What is claimed is:

1. A photonic switching system comprising:  
demultiplexing logic for demultiplexing optical data streams from a  
5 plurality of incoming fibers;  
dropping/passing logic operably coupled to the demultiplexing logic  
for receiving the demultiplexed optical data streams from the demultiplexing  
logic and selectively dropping or passing each demultiplexed optical data  
stream;  
10 photonic switching logic operably coupled to the dropping/passing  
logic for receiving the passed optical data streams from the dropping/passing  
logic and switching each passed optical data stream to an output port of the  
photonic switching logic; and  
combining logic operably coupled to combine the switched optical data  
15 streams from the photonic switching logic with a number of new optical data  
streams to form a plurality of outgoing optical signals.
2. The photonic switching system of claim 1, wherein the demultiplexing  
logic comprises a plurality of demultiplexers, each demultiplexer couplable to  
20 an incoming fiber for demultiplexing optical data streams from the incoming  
fiber.
3. The photonic switching system of claim 1, wherein the  
dropping/passing logic comprises a plurality of drop-only fabrics, each drop-  
25 only fabric operably coupled to receive a plurality of demultiplexed optical  
data streams from the demultiplexing logic and selectively drop or pass each  
demultiplexed optical data stream.
4. The photonic switching system of claim 1, wherein the combining logic  
30 comprises a plurality of combiners, each combiner operably coupled to  
combine a plurality of switched optical data streams from the photonic cross-

5. The photonic switching system of claim 1, wherein the combining logic comprises:

second combiners, each of said second combiners operably coupled to combine the combined optical signal from a corresponding first combiner with a number of new optical data streams to form an outgoing optical signal.

6. A photonic switching apparatus comprising:

demultiplexing logic for demultiplexing optical data streams from a plurality of incoming fibers;

dropping/passing logic operably coupled to the demultiplexing logic  
5 for receiving the demultiplexed optical data streams from the demultiplexing logic and selectively dropping or passing each demultiplexed optical data stream;

photonic switching logic operably coupled to the dropping/passing logic for receiving the passed optical data streams from the dropping/passing  
10 logic and switching each passed optical data stream to an output port of the photonic switching logic; and

combining logic operably coupled to combine the switched optical data streams from the photonic switching logic with a number of new optical data streams to form a plurality of outgoing optical signals.

15 7. The photonic switching apparatus of claim 6, wherein the demultiplexing logic comprises a plurality of demultiplexers, each demultiplexer couplable to an incoming fiber for demultiplexing optical data streams from the incoming fiber.

20 8. The photonic switching apparatus of claim 6, wherein the dropping/passing logic comprises a plurality of drop-only fabrics, each drop-only fabric operably coupled to receive a plurality of demultiplexed optical data streams from the demultiplexing logic and selectively drop or pass each  
25 demultiplexed optical data stream.

9. The photonic switching apparatus of claim 6, wherein the combining logic comprises a plurality of combiners, each combiner operably coupled to combine a plurality of switched optical data streams from the photonic cross-  
30 connect switch with a number of new optical data streams to form an outgoing optical signal.

10. The photonic switching apparatus of claim 6, wherein the combining logic comprises:

first combiners, each of said first combiners operably coupled to combine a plurality of switched optical data streams from the photonic cross-connect switch to form a combined optical signal; and

second combiners, each of said second combiners operably coupled to combine the combined optical signal from a corresponding first combiner with a number of new optical data streams to form an outgoing optical signal.

11. A photonic switching system comprising:

demultiplexing logic for demultiplexing optical data streams from a plurality of incoming fibers;

dropping/passing logic operably coupled to the demultiplexing logic for receiving the demultiplexed optical data streams from the demultiplexing logic and selectively dropping or passing each demultiplexed optical data stream;

photonic switching logic operably coupled to receive the passed optical data streams from the dropping/passing logic and a number of new optical data streams and to switch each of said optical data streams to an output port of the photonic switching logic; and

combining logic operably coupled to combine the switched optical data streams from the photonic switching logic to form a plurality of outgoing optical signals.

12. The photonic switching system of claim 11, wherein the demultiplexing logic comprises a plurality of demultiplexers, each demultiplexer couplable to an incoming fiber for demultiplexing optical data streams from the incoming fiber.

13. The photonic switching system of claim 11, wherein the dropping/passing logic comprises a plurality of drop-only fabrics, each drop-only fabric operably coupled to receive a plurality of demultiplexed optical data streams from the demultiplexing logic and selectively drop or pass each demultiplexed optical data stream.

14. The photonic switching system of claim 11, wherein the combining logic comprises a plurality of combiners, each combiner operably coupled to combine a plurality of switched optical data streams from the photonic cross-connect switch to form an outgoing optical signal.

15. A photonic switching apparatus comprising:

demultiplexing logic for demultiplexing optical data streams from a plurality of incoming fibers;

dropping/passing logic operably coupled to the demultiplexing logic  
5 for receiving the demultiplexed optical data streams from the demultiplexing logic and selectively dropping or passing each demultiplexed optical data stream;

photonic switching logic operably coupled to receive the passed optical data streams from the dropping/passing logic and a number of new  
10 optical data streams and to switch each of said optical data streams to an output port of the photonic switching logic; and

combining logic operably coupled to combine the switched optical data streams from the photonic switching logic to form a plurality of outgoing optical signals.

16. The photonic switching apparatus of claim 15, wherein the demultiplexing logic comprises a plurality of demultiplexers, each demultiplexer couplable to an incoming fiber for demultiplexing optical data streams from the incoming fiber.

17. The photonic switching apparatus of claim 15, wherein the dropping/passing logic comprises a plurality of drop-only fabrics, each drop-only fabric operably coupled to receive a plurality of demultiplexed optical data streams from the demultiplexing logic and selectively drop or pass each  
25 demultiplexed optical data stream.

18. The photonic switching apparatus of claim 15, wherein the combining logic comprises a plurality of combiners, each combiner operably coupled to combine a plurality of switched optical data streams from the photonic cross-  
30 connect switch to form an outgoing optical signal.